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Instructional design framework for educational media

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Abstract

The purposes of this study are to 1) synthesize an instructional design framework from the three instructional design theories, and 2) create an instructional design framework for educational media, and 3) study students' opinions for educational media. The synthesis was first made through the Delphi technique with 17 experts to identify their perspectives on the three instructional design theories. The sampling group was 42 undergraduate students of Rajamangala University of Technology Thunyaburi, Thailand. The instruments were educational media according to Instructional design framework; an achievement test; and a questionnaire to assess students' opinions toward the developed educational media. Statistical procedures for data analysis included the E_1/E_2 , mean, standard deviation, and t-test. The results revealed that the framework provides excellent potential for development and evaluation. The study confirmed that for instruction to be successful, various aspects of the environment should be considered such as application of domain knowledge, conceptual theory, and evaluation of the overall quality of the designed environment. Educational media had the efficiency at the 82.5/80.5 efficiency criteria, students were learned from the packages achieved significant learning progress at the .05 level and their opinions were at the highly agreement level regarding the appropriateness of the instructional media.

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Keywords: Instructional Design; framework; Educational Media; Synthesis; Delphi technique.

1. Introduction

One of the most useful applications of the World Wide Web (WWW) integrated with information technology is for education use as the web-based, distance, distributed or online learning to maximize student learning, providing learners and educators a wide range of new and interesting learning experiences and teaching environments different from the traditional classroom context of education. Electronic media technology-enhanced and student-centred learning environments can facilitate the learning and understanding of abstract concepts since students can notice graphically displayed changes of concrete experience (Hannafin & Land, 1997; Alexander, 2001). Effective e-learning environments allow students to work socially with each other. To achieve it, the core elements are the presence of the teacher, the availability of printed resources and the purposive interaction with the computer by students (Phillips, 2005).

Although education medias are widely used in all educational levels, it should be known that vocational education needs both academic and practical approaches. Each approach requires different instructional design frameworks. Therefore, the instructional design for education media which this paper are discussed in behavior learning, creative thinking learning, and organization learning, with their were

tree psychology theories framework were as a guide for create and development a questionnaire to submit to educational experts. Based on the Delphi technique, these three synthesize were in order to create a new method for process learning via instructional of education media, which may be applied to both online and offline in education media and teaching of vocational level.

The researchers used the Delphi technique so that experts were able to express their opinion on what they agreed in order to create an instructional framework that complies with psychological principles according to an instructional design framework for autonomy. This framework will help learners achieve their learning objectives effectively and efficiently, as well as help learners to understand in a faster and more stable way (Sangsawang; Jitgarun; & Kaattikomol, 2006,). Theoretical frameworks provide a myriad of ways in which instructional design framework for education media practicums may be used, based upon the instructional and pedagogical needs of the vocational course. The development of instructionally effective online learning environments that meet these pedagogical needs requires the application of appropriate instructional design principles. In designing an online instruction, the underlying pedagogical philosophy and application of learning theories, including constructivism and constructionism influence decisions regarding what instructional strategies may be adopted (Dick, Carey & Carey, 2005). Furthermore, the relationships between the design process framework and the effectiveness of the instructional design framework for education media environment are discussed.

2. Literature review

This study develops a framework based on three theories which include learning theories in behaviourisms, creative thinking, and organization learning. Each of the theories involves the psychology of learning as follows -:

2.1 Behaviourism's Theories.

Cognitive processes and the ways in which thoughts occur and the ways in which behaviourism arises from them are the subject of considerable study. This particular study looks at how learning is affected. It is believed that instructional design needs to be applicable to cognitive, behavioural, and attitudinal learning so that the strategies work together to create understanding (Taylor, 1996), to be applicable (Merriam & Caffarella, 1991), to create cognition and elements of situated cognition, to build on cognitive or mental phenomena (Lynch & Bogen, 2005), to create cognitive activity (Jetin, 2006), and cognitive organizers (Tan, Dawson, & Venville, 2008), and to operate processes of memory. Therefore, taken as a micro theory, it sets out a set of procedures which can be followed for each instructional event that can enhance learning. A nine step procedure was developed by Gagné and these steps work together with the cognitive strategies learning theory (Kruse, 2000). In the instructional design framework the first principle is 'attention', which follows the cognitive strategies learning theory, and the second principle, 'announcing the objectives further focuses the trainees' attention The recall of what has been previously learned brings the memory into action. The nine step procedure of instruction is examined in more detail later, with additional information coming from the relevant sections of social learning theory (Blanchard & Thacker, 2007), and the way in which an instructional event corresponds with a learner's internal mental process is also explained. How the interactive content in an e-learning course can keep the learners' attention is described in Gagné's nine step procedure of instruction (Muzio & Mundell, 2002).

Table 1. Gagné's nine events of instruction (Kruse, 2002)

Instructional Event	Internal Mental Process
1. Gaining attention.	Stimulates and activates receptors.
2. Informing learners of objectives.	Creating level of learning expectation.
3. Stimulation of the recall of prior learning.	Retrieves and activates short-term memory.
4. Presenting the content.	Selective perception of content is formed.
5. Providing learning guidance".	Leads to semantic encoding of long term memory.
6. Eliciting Performance (practice).	Responding to questions which enhance encoding and verification.
7. Providing feedback.	Reinforcement and assessment of correct performance.
8. Assessment of performance.	Retrieval and reinforcement of content for final evaluation.
9. Enhancing retention and transferring to the job.	Retrieval and use of learned skill in new situation.

2.1 *Creativethinking Theories.*

Learning by doing is the most popular and effective process of learning ever adopted by psychology, and it is based on practical training in order to create vocational skills the trainees gain experience in group participation in techniques or technology learning. The focus is on constructivist learning theory, the ways of doing and thinking, (Piaget, 1972), and humanist activities in which thoughts occur (Merriam & Caffarella, 1991). Most agree that learning by doing, which focuses on knowledge construction based on the learner's previous experience, is a good fit for e-learning (see Harman & Koohang, 2005; Hung, 2001; Hung & Nichani, 2001; Koohang & Harman, 2005). Theories advanced by Dewey (1916), Piaget (1972), and Bruner (1990), state that the constructivism learning theory is based on a learner's prior experience (Koohang, Riley & Smith, 2009). Woolfolk states, 'the key idea is that students actively construct their own knowledge: the mind of the student mediates input from the outside world to determine what the student will learn. Learning is active mental work, not passive reception of teaching' (Koohang, Riley & Smith, 2009). Honebein proposed a target to aid the design of constructivism in learning settings in which there were seven goals. These were: to provide experience with the knowledge construction process; to provide experience in and appreciation of multiple perspectives; to embed learning in realistic and relevant contexts; to encourage ownership and voice in the learning process; to embed learning in social experience; to encourage the use of multiple modes of representation and to encourage self-awareness in the knowledge construction process (Honebein, 1996).

2.2 *Organization learning Theories.*

There is a focus on constructionism (Papert, 1991); knowledge-building, situating constructionism, society and situation (Bandura, 2000 & Merriam & Caffarella, 1991), situated learning, social negotiation (Baptista & Fowell, 1996), social constructionism and constructivism, and social contexts. These theories rest upon the supposition that there must be a social context in which the learner can build and develop his ideas (Kafai & Resnick, 1996). Ideas cannot be transmitted by a teacher, peer, or book—they must be created. A person comes up with an idea, and constructionism then adds to this fundamental notion that knowledge is built up more effectively when a person is engaged in an activity which means something to him. In constructionism, both the effect and the gaining of knowledge are equally important, so when used for vocational Internet-based training, the curriculum must be set out to ensure that the learner becomes part of it and gives him the desire to proceed further. Online-training should make the trainee interested in building his/her own meaningful online tools, otherwise, he/she might become unresponsive, and socially, an instructional design model should have the objective of preparing learners for the world of work that influences students to work hard and achieve academically. Students to be in a state of flow engagement in learning tasks. It is also predicted that being in a state of flow will contribute to high academic performance. (Muzlia, Eliasb, Noahb, and other., 2010)

2.3 *Educational media.*

Electronic learning media in technology-enhanced and student-centered learning environments can facilitate the learning and understanding of abstract concepts now that students can notice graphically displayed changes of concrete experience (Hannafin & Land, 1997; Alexander, 2001). Effective e-learning environments allow students to work socially with each other. To achieve it, the core elements are the presence of the teacher, the availability of printed resources and the purposive interaction with the computer by students (Phillips, 2005). The e-learning in high schools and academic performances were evaluated through several assignments designed by the IT course instructors affect to students were indicated that computer skill levels did have a direct correlation with a student's academic performance level. The database was further parsed based on demographical factors, resulting in a set of commendations to enhance the effectiveness of e-learning. (Pardamean & Suparyanto, 2014). Therefore, In parallel with the technological developments dominating usage of digital tools in science and education, the traditional education methods which are still using in many design school, the endeavor indicates that determine the appropriate learning method by considering individuals different cognitive style. The cognitive styles mean classify individuals according the way of perceive information and process it. Through this way, as subjects of the study, students categorized in respect to their cognitive styles whether field dependence or field independence, and then the relation between their cognitive style and spatial knowledge acquisition from virtual environment was observed. While defining digital tools in design education, the need of differences related to cognitive styles should be considered, this is supported by the data from this study

which are indicating the increase of students' spatial knowledge in different scale of virtual environments. (Yildirim& Zengel, 2014) and the effect of screen reading and reading from printed out material on student success and permanency in Introduction to computer lesson is investigated. Learners were showed that reading from printed out material is more efficient than screen reading. (Tuncer&Bahadir, 2014).

2. Objective of the study

This study aims (1) to synthesize an instructional design framework from the three instructional design theories, (2) to create an instructional design framework for education media, and(3) to study students' opinions for education media.

3. Research approach

3.1 Sample

The sample was seventeen experts were chosen through the purposive sampling method. Seven experts were qualified in educational psychology and ten in educational technology. They all had a doctoral degree and had worked for over five years in at least the position of assistant professor. Sampling group was 42 undergraduate students of Rajamangala University of Technology Thunyaburi.

3.2 Tools for data collection

1. Semi-structured interviews:Semi-structured interviews (Patton, 1990, p. 339) were used for first round: brainstorming was related to the framework Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories.

2. Questionnaire I: Questionnaire I was used for the second round: the evaluation of the experts' ideas on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theoriesconcerning an instructional design model for self-regulated, online learning at the vocational level. Questionnaire I for evaluating 17 experts on Behaviourism's Theories andCreative thinking Theoriesand organization learning Theories concerned an instructional design model for self-regulated, online learning at the vocational level and used a five-point Likert scale.

3. Questionnaire II:After questionnaire I had been returned, the responses were synthesized and developed through a diagram chart (as shown in chapter 4 and figures 4.1 - 4.8) and then categorized into: similarities and differences. Questionnaire II used a five-point Likert scale (Likert, 1932; Verhagen et al., 1998; Linacre, 2002) (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = moderately agree, 5 = strongly agree).

4.Questionnaire III:After questionnaire II had been returned, the responses were identified, categorized and condensed into major themes and suggestions and sent back to all experts for review and consensus for the fourth round. Questionnaire III was used to check the content validity by 17 experts based on 'yes' or 'no, 'unsure'.

5. Pre-test - Post-test: Learner was do Pre-test before learn with education media, after that they was do Pros-test for a questionnaire to assess students' opinions toward the developed education media. Statistical procedures for data analysis included the E_1/E_2 , mean, standard deviation, and t-test.

6.Questionnaire IV: Questionnaire for student' appraisal, Instrument for data collection was a questionnaire regarding student's self-appraisal for education media.

3.3 Data analysis

1.The data was analyzed by using frequency, percentage, content analysis, and Mind Manager application.

2.The operation was done by using three types of tools (1) brainstorming, (2) evaluation, and (3)re-evaluation.

3. Data analysis was done using SPSS/FW (Statistical Package for Social Science/for Windows) software. The part I with selection items was analyzed using frequency and percentage. The part II with five scales was analyzed using mean (\bar{x}), standard deviation (S.D.) and correlation.The levels of agreement from respondents were as follows: Average Score of 1.00–1.49 means strongly disagree whereas average score of 4.50 – 5.00 means definitely agree.

4. Collection Data was collection opinion of teachers at vocational education for confirms using an instructional design framework for education media.Study students' opinions for education mediawasundergraduate students of Rajamangala University of Technology Thunyaburi.

3.4 Method

The data were collected through the Delphi technique. There were four rounds for the data collection as follows:

First Round: Brainstorming

The first round involved brainstorming from the experts through semi-structured questionnaires based on behaviourism's theories and creative thinking theories and organization learning theories, all of which focus on cognitive processes, the learning by doing approach, and social context. The first round of data collection proceeded as follows:

1. Connected with/contacted/called 17 qualified experts by phone to request their agreement to participate in the study using the Delphi technique.
2. When all 17 qualified experts had agreed, the researcher issued official letters of invitation to invite experts.
3. Appointments were made with all qualified experts on the date and time preferred.
4. Eight experts allowed the researcher to meet them in person. The questionnaire was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researchers were making notes.
5. Nine experts preferred to fill out the questionnaire by post and they were returned to the researcher. There were no other comments from these experts.
6. Answered questions and explained the purpose of the questionnaires.
7. The researcher separated the replies into similar and different categories to get a majority opinion.
8. The data from the interviews based on the semi-structured questionnaire were grouped and arranged to draft Questionnaire I concerning teaching and learning design based on the three psychology theories, Behaviourism's Theories and Creative thinking Theories and organization learning, which focus on cognitive processes, the learning by doing approach, and social context. The researcher who prepared Questionnaire I followed Likert's five rating scale. Data analysis used frequency and percentage. The part with five scales was analyzed using mean (*M*), standard deviation (*SD*) and correlation. The levels of agreement from respondents were as follows: average score of 1.00-1.49 means strongly disagree whereas average score of 4.50-5.00 means definitely agree.

Second Round: Evaluation of the experts' ideas

The second round evaluated the ideas using the Likert five-rating scale in questionnaire II.

1. Connected with/contacted/called 17 qualified experts by phone to request their agreement to participate in the study using the Delphi technique.
2. When all 17 qualified experts had agreed, the researcher issued official letters of invitation to invite the experts.
3. Appointments were made with all qualified experts on the date and time the experts preferred.
4. Eight experts allowed the researcher to meet them in person. Questionnaire II was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researcher was making notes.
5. Nine experts preferred to fill out the questionnaire II by post and it was returned to the researcher. There were no other comments from these experts.
6. The researcher then processed the new data from the first round open-end questionnaire to check for a consensus. The researcher selected the items from the results of the semi-structured interview questionnaire.
7. The results of synthesis of similarities and differences led to diagrams, "Work well for decision trees", (Strawbridge, 2007, p. 640)
8. The data collection from 17 experts and was conducted through the post or by interview.
9. The values: median, mode, and interquartile range in each question item were measured.
10. The data regarding the similarities and the differences based in three psychology theories regarding behaviourism's theories and creative thinking Theories and organization learning Theories; all three theories focus on mental processes, learning by doing approach, social context were synthesized. After that, the researcher created an instructional model of learning process theories for self-regulated education media, online - offline learning at vocational education.

Third Round: Re-Evaluation

In the third round the 17 experts were required to respond 'yes' or 'no' and 'unsure' to the questionnaire III.

1. Selected the items from the results of Questionnaire II. These included all principles, teaching-learning activities strategies, teaching-learning environments, and stages of instructional sequence which make up mental processes, learning by doing, and social context.

2. The findings were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed while the differences meant the reverse. The results of the synthesis were used to develop Questionnaire III.

3. Appointments were made with all qualified experts on the date and time the experts preferred.

4. Eight experts allowed the researcher to meet them in person. Questionnaire III was handed to all experts at the appointment. Three experts wrote comments on the questionnaires in front of the researcher. Five experts gave opinions while the researcher was making notes.

5. Nine experts preferred to fill out the questionnaire III by post and it was returned to the researcher. There were no other comments from these experts.

6. Created an instructional model of learning process theories for self-regulated online learning in vocational education.

7. After the researcher concluded Questionnaire IV, the framework for an instructional model of learning process theories for self-regulated online learning in vocational education was developed.

Fourth Round: Solution-Report

In the fourth round, the experts came to a resolution and made a report since the feasible ideas had been identified. Furthermore, the experts would acknowledge all the group's opinions with the ideas or strategies and details of implementation.

4. Findings and discussion

4.1 Delphi technique

First round: In the brainstorming session, the researcher focused on Behaviourism's Theories and Creative thinking Theories and organization learning Theories, covering cognitive processes, learning by doing, social context, and the results from this analysis was used for the framework for the semi-structured interviews. The questionnaire was sent to a group of 17 experts who were given two to two and a half weeks to complete and return the first round of questions. After the responses were received, the answers were categorized, synthesized, and developed into another questionnaire I.

Second round: This was the evaluation of the experts' ideas phase and consisted of the evaluation of the experts' responses by using a Likert five-rating scale (Likert, 1932, p. 1-55). In round two evaluations, Questionnaire I was used for the management of the experts' ideas on Behaviourism's Theories and Creative thinking Theories and organization learning Theories concerning an instructional design model for self-regulated, online learning at the vocational level.

Third round: In this re-evaluation stage, the selected items from the results of questionnaire I included all principles, teaching-learning activities/strategies, teaching-learning environments, teaching-learning models from behaviourism's theories (cognitive processes) and creative thinking theories (learning by doing) and organization learning theories (social context) concerning an instructional design model for self-regulated, online learning at the vocational level were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed, while the differences meant the reverse. The results of the synthesis were used to develop questionnaire II (using a five-point Likert scale) which was sent to the experts for the third round.

Fourth round: By this round, the feasible ideas had been identified, resolved and reported. The experts would acknowledge all the group's opinions with the ideas or strategies and details of implementation.

4.2 Brainstorming

The researchers conducted semi-structured interviews with 17 experts for the first round: brainstorming of experts' opinions would be related to the framework developed from mental processes, learning by doing approach and social context.

The researchers analysed the interviews of the experts' opinions about each idea. The details interview form was in four parts as follows: key ideas and principles, teaching-learning activities, strategies,

instructional environments and stages of the instructional sequence.

The researchers synthesized the first round of opinions of the experts using a Likert five point rating scale. Following this step, an instructional design framework was prepared covering Behaviorisms Theories and Creative thinking Theories and organization learning Theories.

4.3 Evaluation

The ideas gained from the experts were evaluated using Likert, a five-point rating scale, questionnaire for the second round as shown in the evaluation of the 17 experts' ideas on cognitive processes, creative learning, and organization learning concerning an instructional design framework for education media.

The items from the results of questionnaire I were selected. This meant that all key ideas, principles, teaching-learning activities, strategies, instructional environments, and stages of instructional sequence comprising cognitive processes, creative thinking, and organization learning were pooled together as similarities or differences. The similarities meant that most of the 17 experts agreed while the differences meant the reverse.

The results of the synthesis of similarities and differences led the researchers to develop a diagram chart. Then, the 17 experts were required to respond "Yes" or "No" to questionnaire II.

4.4 Re-evaluation

The researchers selected the items from the results of questionnaire II. These included all key ideas and principles, teaching-learning activities, strategies, instructional environments, and stages of instructional sequence comprised from cognitive processes, creating thinking, and organization learning.

After the researchers concluded questionnaire III, the framework for instructional design framework for education media was developed. The results of this research focus on three clusters that help create the framework for the theories and also include aspects of the learning process. The study allowed for the expression of experts' opinions, and similarities and differences could be described in the framework.

Re-evaluation was found teaching-learning activities/strategies for education media framework that instructors are able to apply the results of this research in developing both education media and online media learning or offline media by using instructional design framework for education media with there were psychological principles via multimedia, preparing the suitable content for instructional design for education media, learning by themselves, designing the approach for online learning which suits learners most and understand the problems arisen from online learning so that learners can integrate ideas, build up body of knowledge by themselves and self-appraisal.

4.5 Self-Appraisal for education media.

Phase I : Students' Self-Appraisal for education media.

In order to obtain the data concerning students' self-appraisal for education media, the researchers developed a semi-structured questionnaire regarding to student's self-appraisal for education media. The questionnaire focuses on the effectiveness of online learning. After collecting the data from the sampling group of 100 Rajamangala University students in the academic year 2014 by random sampling method, the following self-appraisal for online learning from students were: 1) To make online learning effective, there must be appropriate materials supporting information resources, 2) Instruction must improve learner's learning skills, 3) Instructors must update data to students with electronic learning, and 4) Education learning on one's own must be convenient and easy for students.

Phase II : Online Learning Model as Perceived by Learners.

From the responses of the questionnaires regarding Online Learning Model, it was found that: 1) Most students look forward to learning new skills, but they would rather have face-to-face interaction and need faculty to constantly remind them of due dates and assignments, 2) Most students can go to campus anytime, and the amount of time they have to work on an online course is less than that for a class on campus; therefore, online learning is a personal interest that could be postponed, 3) As of other items, most students need reminding to get things done on time, classroom discussion is sometimes useful to them, they try to follow the directions on their own, then asking for help as needed, and sometimes need help to understand the text.

Phase III: Online Learning Model as Perceived by Instructors.

5. Conclusion

In this article, the researchers have offered a framework and design process for education media environment. The implementation of the internet-based involves several steps including a consideration of various aspects of information, conceptual development, theories of psychology and an evaluation of the overall quality of the system environment. In particular, the research aims to improve the design process and usability of the Internet-based environment. The study also confirms that for GCC Framework for education media to be successful, various aspects of the online environment should be considered. These include the application of domain knowledge, conceptual theory, theories of psychology and an evaluation of the overall quality of the design process. This is presented in the two parts that follow as in part I in Figure 1: key idea and principle and part II: in Figure 2:GCC frameworks.

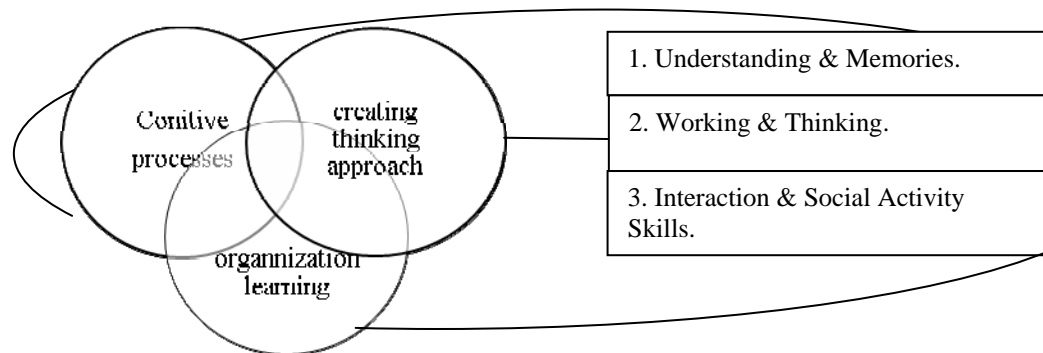


Fig. 1.Key idea and principle

Stages of instructional sequence of three theories

Table 2: Stages of instructional sequence according to mental processes, learning by doing and social context as follows: (Thosporn, 2006)

Cognitive processes	Creating Thinking	Organization Learning
-Instructors create stimuli to activate receptors.	-Learners rethink to activate pre-knowledge.	- Learners and instructors share thoughts and build their own self- knowledge.
-Instructors create level of Expectationfor learning.	-Learners find questions.	- Learners and instructors build structures to construct their own self- constructionism
-Instructors build retrieval and activation of short-term memory.	-Learners perform self-regulated learning by doing theirtasks.	-Learners and instructors construct knowledge - building communities.
-Instructors select perception of content.	-Learners share activities together.	-Learners and Instructors discuss and construct knowledge organization.
-Instructorscreate semantic encoding forstorage of long-term memory.	-Learners share understanding of knowledge with instructors.	-Learners and Instructors share and construct information to manage knowledge.
- Instructors guide how learners respond to questions to enhance encoding.	- Learners share regulating activities to transfer knowledge.	- Learners and Instructors construct and collaborate on their tasks.
-Instructors create verification, (reinforcement and assessment of correct performance).	-Learners present activity.	-Learners and instructors combine experiences to develop their own self.
-Instructors create retrieval and reinforcement of content as final evaluation of learning, and retrieval and generalization of learned skills for learners to build new situation		

4.5 GCC framework

In this section, the researchers present Instructional Design Framework for education media or researcher called GCC framework that there have got it's from experts' congruence of selected psychology theories, namely cognitive processes, creative thinking learning, and organization learning classified by "Teaching-learning models." The researchers created an instructional design framework for education media. The research involved a framework with the sample for the study consisting of 100 instructors who developed electronic media (such as e-Books, and e-Learning, WBI, and CAI) in the vocational education fields of electrical engineering, electronics, civil engineering, and mechanics from several faculties of technical education in universities in Thailand. The teaching-learning activities/strategies for education media framework that it's call GCC framework as show in picture 1, there have three parts such as stages of instructional sequence; teaching-learning environments; Students' self-appraisal for education media.

Stages of instructional sequence of GCC framework

These frameworks have stages of instructional sequence for teaching and learning 6 steps. The core components as follows:

Step 1: Creating conditions for internal mental learning process as in insight information. Instructors provide on operating conditional learning, giving information, signal learning, objectives, expected outcomes, benefit from learning and activities and create teaching criteria to suit the learners with external conditions.

- a) Chaining: Instructors provide events of learning as well as a step-by-step process of learning.
- b) Verbal association: Instructors use a process learning and instruction model.
- c) Discrimination: Learners learn through testing and feedback.
- d) Concept learning: Instructors create tasks and conditional learning as a method and stages of learning process for learners.

Step 2: Creating processing memory. Learners learn how to achieve the objectives of learning and to meet conditional learning and created rule learning by them own.

Step 3: Perception knowledge and Information. Instructors provide programmed instructions, tutorials, simulation, games and drill as well as practice and test for learners. They were solving problem by them self.

Step 4: Providing situated cognition, a teacher was created content and activities learning. Learners are encouraged to recognize and understand reflective thinking and thinking initiatives. They can be them creative thinking.

Step 5: Performing processes access. Teacher was designed Drills and practices. Learners can plan, set assumption, investigate and solve problems by themselves. They should use simulation and gaming media by themselves, self-learning.

Step 6: Supporting construction of knowledge.

GCC framework
Teaching&learningActivities&strategiesInnovation & Attributions.

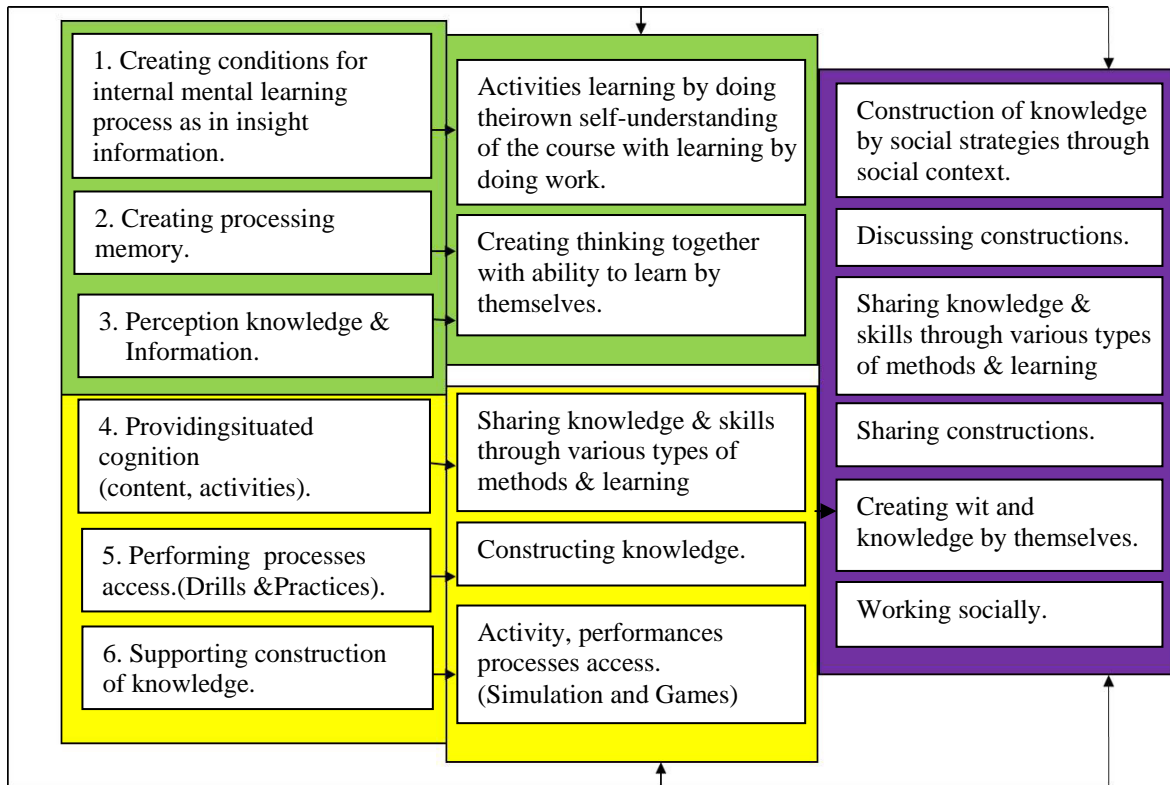


Fig. 2. GCC framework

Activities/ strategies

1. Learner's activities/strategiesstep 1 to step 3, Learners should be activities learning by doing theirown self-understanding of the course with learning by doing work and creating thinking together with ability to learn by themselves.In prat,step 5 to step 6, Learner should be sharing knowledge & skills through various types of methods & learning, Constructing knowledge, Activity, performances processes access.Simulation and games)

2. Instructor encourages to learners cognitive.Teacher should be give signals learning; chaining;verbal association; discrimination learning; concept learning; rule learning; problem solving; creative thinking; reflective thinking; thinking initiatives.

3. Learner created thinking by them self. Teacher should be encourage to leaner by self-learning Co-operative learning; Project-based learning Problem-based learning; Situation learning Group Investigation Inquiry method; New knowledge Simulation and Gaming.

4. Instructor and learner should be creating teaching-learning types with organization learning together by learner do brainstorms for project based; planning their own learning; learning by doing; presentation; learning assessment; modifying actions.

Innovation and Attributions

Instructor was correlated with learners for creating innovation. The core components as follows:

- a) Construction of knowledge by social strategies through social context.
- b) Discussing constructions.
- c) Sharing knowledge & skills through various types of methods & learning
- d) Creating wit and knowledge by themselves.

- e) Working socially.
- f) Teaching-learning environments.
- g) Learning environments according to cognitive processes, learning by doing approach, and social context.
- h) The cognitive processes should be using education media, concept map, spider diagram, Fishbone, Structured, T-chart.
- i) Creating thinking should be using action, activities and environments; sharing knowledge & skills through various types of social activities; Activity/ opportunities to develop meta-cognitive knowledge about persons; Tasks; Strategies to evaluate their learning as part of the total experience.
- j) Organization learning should be using interaction with social constructionists, Experiential learning; Perceptions of experience from their own understanding; Construction of their own thinking of it as “learning- by-making”; Actions their working socially; Interaction and cognitive processes.

Students’ Self-Appraisal for education media

From the course designed for self online learning, it was found that the course began with designing appropriate contents in accordance with the curriculum and objectives. Learners and instructors have their roles in learning together as well as expressing opinion, analyzing, and solving problems on their own. Instructor is just a mentor. Learners will succeed if an instructor provides them with appropriate learning strategies for online learning. Those are:

- 1) Learning environment under supervision from instructors in online learning in accordance with the course objectives.
- 2) Collaborative learning should be used for online learning.
- 3) Instructional strategies need tools to design online learning with ease under 10 teaching commandments, which are often used in classroom and could be used in online learning as well. Ten teaching commandments are: (a) Learning Contracts, (b) Lecture, (c) Discussion, (d) Self-Directed Learning, (e) Mentorship, (f) Small Group Work, (g) Project, (h) Collaborative Learning, (i) Case Study, and (j) Forum.

According to instructors’ opinions, online learning can be included with instructional strategies as shown in Mind Map or Figure 3:

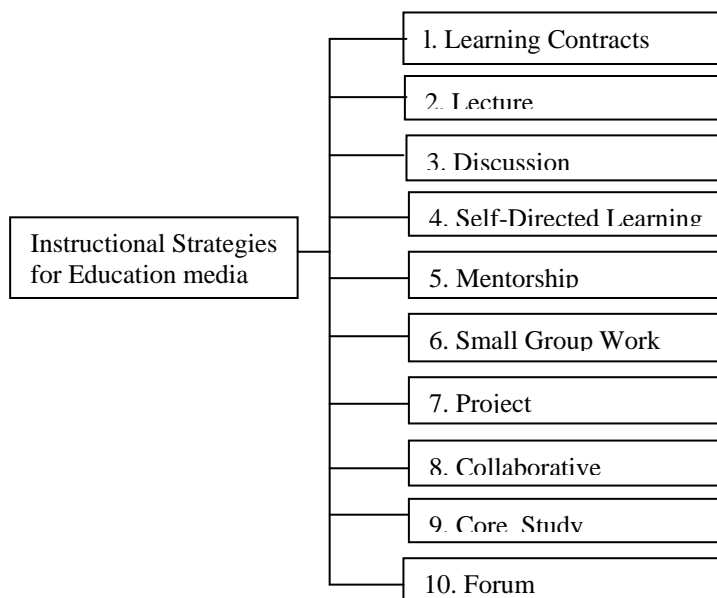


Fig.3. Students’ Self-Appraisal for education media

From the research results, the discussions could be as follows:

1) Most students look forward to learning new skills, but they would rather have face-to-face interaction and need faculty to constantly remind them of due dates and assignments. The probable causes for this finding were given by Northover (2002). There are four major barriers to students' participation in online activities: (1) Lack of convenient access to technology and low technological literacy, (2) Students' immaturity and genuine eagerness to learn, (3) Language confidence – poor students are likely to have an extra disadvantage, and (4) Learning style – both individual learning preference and the experience of previous education systems. It is within the capacity of the tutor to have an effect on some of these possible barriers, more than on others.

2) Most students can go to campus anytime, and the amount of time they have to work on an online course is less than that for a class on campus; therefore, online learning is a personal interest that could be postponed. Normally, instructors are the main characters in classroom. Every learner depends on instructors. However, for online learning, learning resources and information are the center of this approach in order that each learner can search for new knowledge and information regarding the instruction. Without instructors, some learners get lost and do not know what to do. This type of learners is called by Annette Vincent and Dianne Ross "perceptive students". They often postpone doing an assignment until the very last minute. It is recommended to divide a complex project or paper into a series of sub-assignments and providing deadlines for each sub-assignment. The deadlines keep the perceptive students on target. The sub-assignments provide for continuous feedback.

3) Most students need reminding to get things done on time. Classroom discussion is sometimes useful to them. They try to follow the directions on their own, then ask for help as needed, and sometimes need help to understand the text. This is in accordance with Musaw(2000) in that learners are satisfied with learning by themselves but they still need to depend on instructors since they are accustomed to learning with instructor in classroom.

4) Suggestions from students' self-appraisal for education media were as follows: (1) New technology tips and tricks need to be regularly updated; (2) Lecturers should be available when learners need advice; (3) Due date for task is required and learners must be reminded but learning time should not be limited; (4) Portfolio should be a requirement to track students' progress; (5) Discussion should also be held in class where instructors facilitate each learner in building up his/her own body of knowledge. From students' self-appraisal for online learning, learners would like to be able to apply knowledge in solving problems in daily life. However, Dabbagh&Kitsantas (2005) had already pointed out the difficulties of online learning in their paper. Their analyses of qualitative data collected revealed that Web-based Pedagogical Tools were highly effective in activating the use of Self-Regulated Learning processes necessary to support specific types of learning tasks required for completion of course assignments only. Therefore, the researchers would like to suggest course developers and providers to offer learners with various kinds of online learning in order to satisfy the demand and the skills of each learning style.

Therefore, All education media level which is focused on teaching both theory and practice, instructors create operational conditional learning. When learners learn by doing it leads to self-discovery. All of education media might be said to be the teaching of procedural knowledge, in contrast with declarative knowledge, usually used in education in the broader scientific field, and which concentrates on the theoretical and abstract conceptual knowledge which is characteristic of tertiary education. Vocational education can be taught at the secondary or post-secondary level and can interact with an apprenticeship system, and increasingly it is recognized in terms of prior learning and partial academic achievement. However, it is rarely considered to meet the traditional definition of higher education. Motivation in the learner is strongly dependent on the learner's confidence in himself or herself and his or her feelings of competence and belief in his or her potential to solve new problems is derived from first-hand experience in the mastery of problems in the past and these are much more powerful than motivation or knowledge obtained from any outside source. The successful completion of challenging tasks helps learners gain confidence and understanding and achieve learning objectives with effectiveness and efficiency, as well as helping them understand in a faster and more stable way. This reflects the National Education Act 1999, which reads: "In organizing the learning process, educational institutions and agencies concerned shall provide training in thinking process, management, how to face various situations and application of knowledge for obviating and solving problems." That view of learning sees learners as

active participants who can construct their own understanding of the world around them. Using past experience and knowledge, learners can make sense of the new information that they have assimilated. In addition, constructivist theory also asserts that meaningful learning occurs within an authentic situation with authentic learning tasks and that learning is facilitated through social interaction, shared thought, and decision making. This is a system which will make Thai learners capable of developing themselves and able to compete in the world's knowledge-based economy.

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